Human Systems
integration division

Automation Human Factors

Objective

Develop a design and validation methodology including software tools for safety critical human machine systems.

Approach

Cognitive engineer (Mike Feary) working with the VNAV reference tool and the SGB editor.

Based on incident and accident reports, full mission simulations and surveys of airline pilots, develop a methodology to identify system design features of the flight deck automation that make it difficult for pilots to understand and learn the system behavior, and that result in operational errors. This methodology and associated software tools help the designer develop systems that eliminate these error-prone features from the design of automation behavior, as well as its displays, controls and the procedures for its use. The methodology has been applied to the analysis and redesign of the pitch autopilot, and the vertical navigation automation of a modern transport aircraft. The methodology has also been used to develop training programs and software tutors for aircraft automation.

Impact

Case studies of the methodology applied to the autoflight systems of commercial aircraft have demonstrated a reduction in training time and operational errors.

Information Technology

The methodology and software tools developed in this project are extensions of formal software engineering methods that account for human capabilities and limitations.

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